ASHLY

Protēa

Digital Audio Products

SYSTEM II

Operating Manual

4.24G - Four Channel Graphic Equalizer / System Processor

4.24GS - Four Channel Graphic Equalizer / System Processor Slave

2.24GS - Two Channel Graphic Equalizer / System Processor Slave

4.24PS - Four Channel Parametric Equalizer / System Processor Slave

2.24PS - Two Channel Parametric Equalizer / System Processor Slave

4.24RD - Full Function Graphic Equalizer Remote Control

Protea System Software

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The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an eqilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the device.

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPKIANCE TO RAIN OR MOISTURE.

TO REDUCE THE RISK OF FIRE, REPLACE ONLY WITH SAME TYPE FUSE. REFER REPLACEMENT TO QUALIFIED SERVICE PERSONNEL.

WARNING:
THIS APPARATUS MUST BE EARTHED

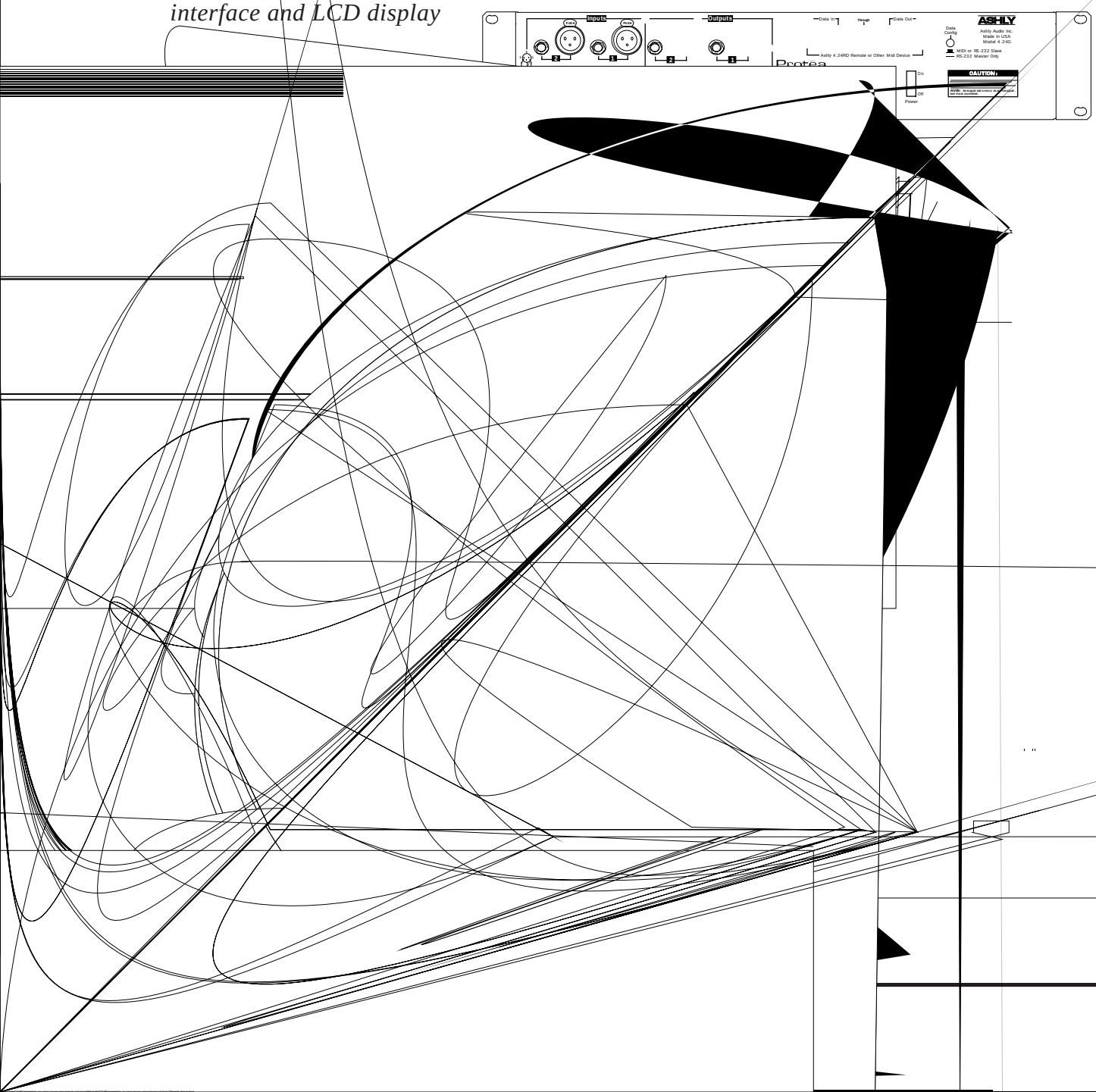
1. INTRODUCTION

Thank you for your purchase of this Ashly Protea SYSTEM II digital audio product. The Protea SYSTEM II series builds on the tradition of quality and value which has earned Ashly its place as a market leader in equalization and signal processing. Please read the entire manual in order to realize all of the powerful features the Protea SYSTEM II series of products has to offer.

1.1 PROTEA PRODUCTS

The Protea SYSTEM II series consists of the following seven products:

4.24G
2u, Four channel processor with keyboard interface and LCD display



1.2 AUDIO FEATURES

The Protea audio components consist of state of the art technologies, beginning with a 24 bit, 48kHz delta-sigma A/D converter with 128x oversampling. Digital processing includes EQ, Compression, Limiting, Shelving, Highpass and Lowpass Filters, and Time Delay, taking place in a 100MHz Motorola DSP56303 high performance DSP processor. D/A conversion uses a 24 bit delta-sigma converter with 128x oversampling. Inputs are precision balanced and RF protected, while outputs may be wired balanced or unbalanced. All audio connections use XLR *and* 1/4" phone

2. AC POWER REQUIREMENTS

Note: The AC power switch for model 4.24G is on the back panel. All Protea devices will perform normally from 90 to 125VAC. A standard IEC-320 AC inlet is provided on the rear panel to accept the detachable power cord shipped with the unit. Units distributed within the United States are preselected for 115VAC, 50-60Hz and should be plugged into a standard NEMA 5-15 3-wire grounded AC receptacle. Most units distributed outside the US are preselected and labeled for 230VAC, 50-60Hz and are shipped with the appropriate power cord. In the event of fuse failure, replace only with same type and rating fuse. If the fuse is internal, refer the product to a qualified service technician for fuse replacement.

The **4.24RD remote control** is phantom powered from its host through two standard three-conductor XLR cables.

3. UNPACKING

As a part of our system of quality control, every Ashly product is carefully inspected before leaving the factory to ensure flawless appearance. After unpacking, please inspect for any physical damage. Save the shipping carton and all packing materials, as they were carefully designed to reduce to minimum the possibility of transportation damage should the unit again require packing and shipping. In the event that damage has occurred, immediately notify your dealer so that a written claim to cover the damages can be initiated. The right to any claim against a public carrier can be forfeited if the carrier is not notified promptly and if the shipping carton and packing materials are not available for inspection by the carrier. Save all packing materials until the claim has been settled.

4. TYPICAL PROTEA APPLICATIONS

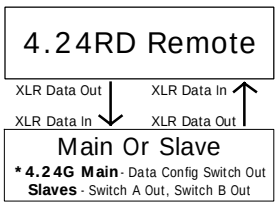
The Protea SYSTEM II product family includes five audio processors, a remote control, and Protea System Software. Various Protea units can be combined to expand the capabilities of a system, adding channels, utilizing remote control, or connecting to a PC. The following illustrations indicate some typical Protea systems. See SYSTEM CONFIGURATION chart on p. 20 for specific switch and preference settings.

4.1 STAND-ALONE

Only the 4.24G can be used as a fully self-contained processor, while any slave unit can function independently once it has been properly set up through external hardware or software.

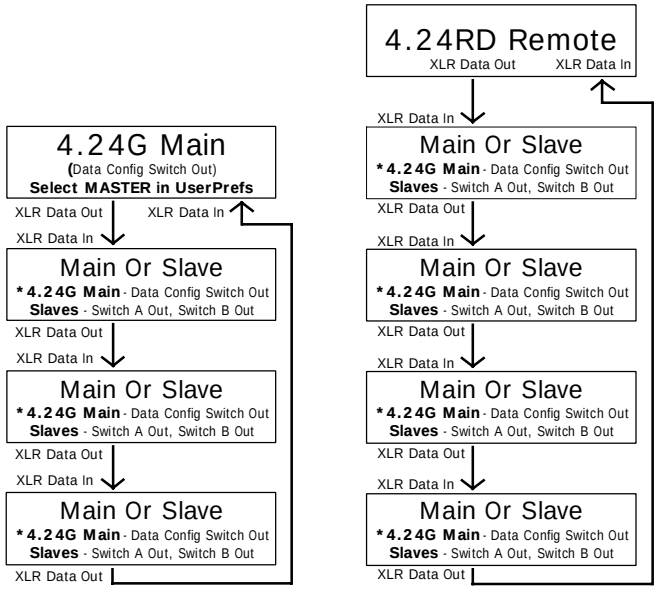
4.2 SINGLE UNIT WITH REMOTE CONTROL

The remote control unit (model 4.24RD) connects to the main 4.24G or any other slave unit, and can run up to 1000 ft. from the host audio unit.


4.24RD Remote
XLR Data Out
XLR Data In
XLR Data In
XLR Data Out
Main Or Slave
*4.24G Main - Data Config Switch Out
Slaves - Switch A Out, Switch B Out

4.3 MULTI-CHANNEL PROTEA SYSTEM

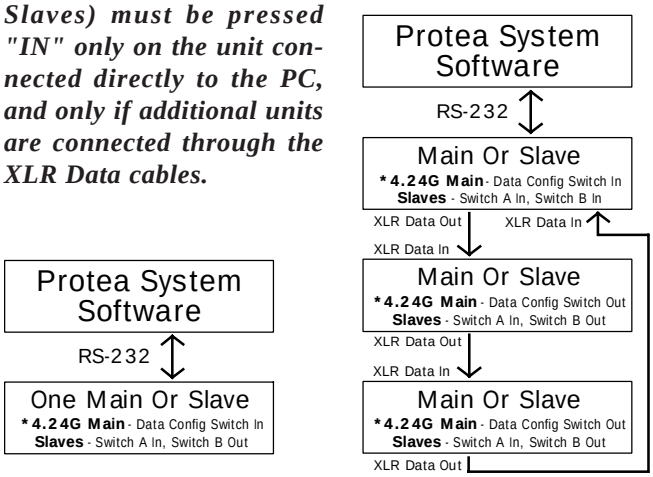
Up to 16 different logical (MIDI) channels can be simultaneously controlled from one Master in an expanded Protea system.



***4.24G Main** - UserPrefs LCD Menu Must Select MIDI

4.4 WITH PROTEA SYSTEM SOFTWARE

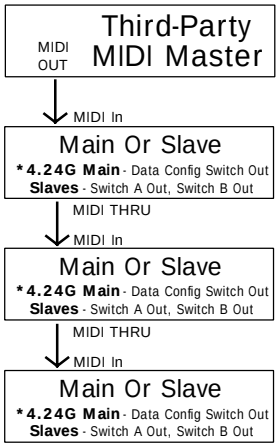
Ashly PROTEA SYSTEM SOFTWARE adds flexibility by allowing comprehensive system control of main or slave units from a PC using the RS-232 Serial port. ***Note: the Data Config Switch (Switch "B" On Slaves) must be pressed "IN" only on the unit connected directly to the PC, and only if additional units are connected through the XLR Data cables.***


Protea System Software
RS-232
One Main Or Slave
*4.24G Main - Data Config Switch In
Slaves - Switch A In, Switch B Out
Protea System Software
RS-232
Main Or Slave
*4.24G Main - Data Config Switch In
Slaves - Switch A In, Switch B In
XLR Data Out
XLR Data In
Main Or Slave
*4.24G Main - Data Config Switch Out
Slaves - Switch A In, Switch B Out
XLR Data Out
XLR Data In
Main Or Slave
*4.24G Main - Data Config Switch Out
Slaves - Switch A In, Switch B Out
XLR Data Out

***4.24G Main** - UserPrefs LCD Menu Must Select RS232

4.5 WITH THIRD PARTY MIDI SYSTEMS

The Protea system uses MIDI as its communication protocol, allowing for external control by other MIDI sources.

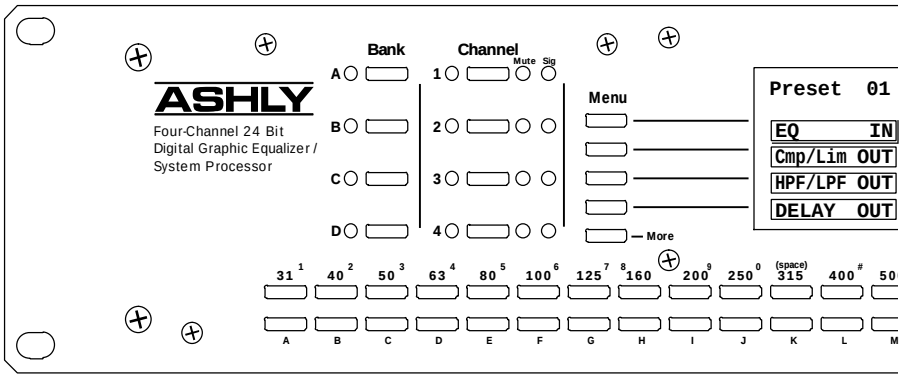

Third-Party MIDI Master
MIDI OUT
MIDI In
Main Or Slave
*4.24G Main - Data Config Switch Out
Slaves - Switch A Out, Switch B Out
MIDI THRU
MIDI In
Main Or Slave
*4.24G Main - Data Config Switch Out
Slaves - Switch A Out, Switch B Out
MIDI THRU
MIDI In
Main Or Slave
*4.24G Main - Data Config Switch Out
Slaves - Switch A Out, Switch B Out

***4.24G Main** - UserPrefs LCD Menu Must Select MIDI

5. KEYBOARD CONTROL FEATURES

5.1 Bank

The four BANK keys are only used on the MASTER Protea unit when multiple units are chained together in a system. ***Note:*** *The 4.24G is shipped from the factory in SLAVE mode, which disables the Bank keys, but can be changed to Master status in the UserPrefs Menu section,* enabling the Bank keys and corresponding LED indicators. Once this is done, each Bank key along with a Channel key selects a MIDI channel.



5.2 Channel

The four Channel keys determine which LOCAL CHANNEL becomes the CURRENT CHANNEL. A green LED shows which Channel is currently selected to the display for editing. All four Channels will always remain active, regardless of which Channel is selected as the Current Channel. ***Note:*** *On the Master unit of a multi-unit system, the four local channels are automatically assigned to Bank A, or MIDI channels 1-4.*

* * * Channel Linking

If you desire one or more Local Channels to track the Current Channel, the Protea system allows CHANNEL LINKING. This forces one, two, or even all three Local Channels' settings *to become identical to and dependent on the Current Channel, regardless of their previous settings.* To link a channel, first select the Current Channel key and simultaneously press and hold the channel key you wish to link, repeating if multiple channels are being linked. Once the link is established, the lowest numbered Local Channel that is linked will become the current, dominant channel,

while any dependent channels will show a flashing LED to indicate linked status. Although the audio paths remain separate, the linked channels now act as one. Any action taken on the Current Channel will also affect the Linked Channel(s). To unlink a channel, simply repeat the linking process to toggle the linked channel off.

***Note**: When two channel keys are simultaneously pressed, a pop-up screen will say "Changing Link Status". In order to prevent accidental linking, the channel keys must be held down for a couple seconds until this screen goes away for the change to take effect.*

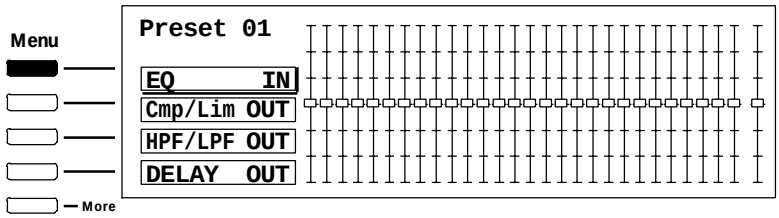
5.3 MENU KEYS

The MENU keys allow quick access to the powerful audio and setup features of Protea products. There are four Menu softkeys and a MORE key which toggles to a second Menu screen. The first screen shows the core audio functions, EQ, Comp/Limiter, HPF/LPF, and Delay, while the second screen displays Metering, User Preferences, MIDI Implementation, and Security features. When the Menu keys select a function, softkeys below the LCD adjust specific parameters within each menu.

An important point to mention regarding the two different Menu Screens is that the first screen consists of audio controls which can be saved to individual Presets, and will vary as the Current Channel or recalled Preset changes. The second screen involves system setup details which are global in nature, in other words they will remain constant regardless of the Current Channel or Preset selection. The following sections explain each Menu and their adjustable parameters.

5.3.1 EQ

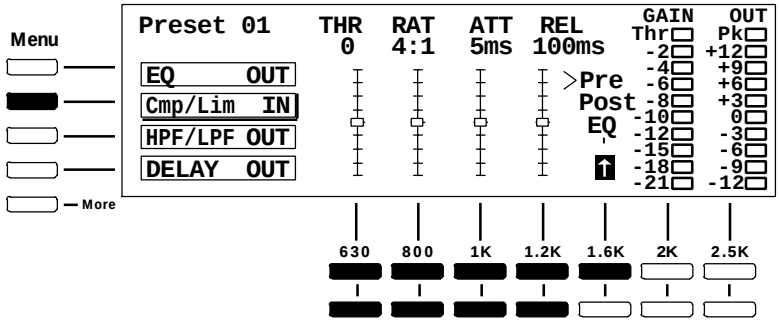
The Protea graphic equalizer consists of 28 bands of Constant Q, reciprocal filters on third octave frequencies with up/down keys for each band. Multiple bands can be adjusted at the same time, and ***individual frequencies can be set flat quickly by pressing both up and down keys together.*** Max filter boost and cut is 15dB, and filter Q is 3.2. ***To begin a new EQ curve with all faders at 0dB, press the FLAT key***.



The IN/OUT key to the right of the LCD display enables or disables the EQ.

5.3.2 Cmp/Lim (Pre/Post)

A full featured, Pre/Post switchable compressor/limiter allows control of THRESHOLD, RATIO, ATTACK TIME, and RELEASE TIME. Limiters are used primarily for eliminating large transient signals which may damage speaker components, and are similarly used for keeping overall audio output levels in a sound system within a specified range. All compressor/limiter parameters are adjusted with the appropriate softkey, found directly below its respective slide-fader control on the display. The current value for each parameter is displayed above its control.



Threshold (THR) is the signal level in dBu or VU (see METERING) above which the limiter begins to prevent further increases in audio levels. The available Threshold range is -20 to +20 when Meters are set for dBu, and -24 to +16 when set for VU . Whenever signal level exceeds the Threshold, the limiter screen indicates the resulting amount of Gain Reduction, or the amount of attenuation in dB which has occurred to signal above the threshold level. Output Metering utilizes dBu or VU as selected in UserPrefs (see sec. 5.3.6 USER PREFERENCES).

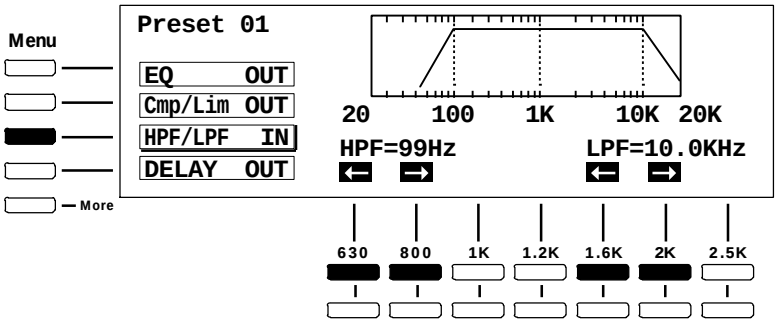
Ratio (RAT) is the degree of attenuation to the signal above the limiter threshold point. As the ratio increases, less signal is allowed to exceed the threshold. For example, with the ratio set at 10:1, a 10dB increase in input level results in just a 1dB increase in output level. Thus a lower ratio is a more pleasant sounding effect, while a high ratio, while accurately preventing signal increases, reduces the dynamic range to a point where the audio sounds unnatural.

Limiter Attack (ATT) and Release (REL) Time Controls display units in milliseconds (ms); however, the actual units are ms per dB. For example, when the Release control is set at 100 ms, the limiter's attenuation will release at the rate of 100 ms per dB, or viewed in another way, it would release 10dB over 1 second of time. The attack and release time action was designed this way to achieve a more natural attack and release behavior of a constant rate rather than time. It should be noted that fast attack and release times may distort the audio signal. This occurs in any limiter because a fast attack or release action changes the gain rapidly which will by definition, distort the waveshape of long wavelength (low frequency) signals. Therefore, it is recommended that longer attack and release times be used for lower distortion.

10-segment meters on the LCD indicate amount of GAIN REDUCTION and OUTPUT LEVEL, including a Peak LED on the output meter. As with EQ and all other audio functions, the limiter is enabled by the In/Out key.

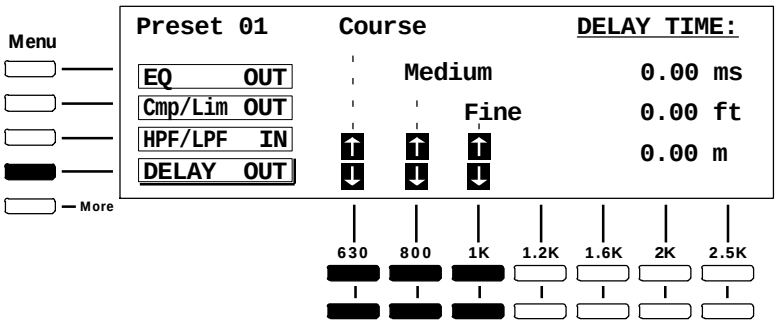
5.3.3 HPF/LPF

The HIGHPASS and LOWPASS filters offer precise frequency adjustment of two 24dB/octave filters, creating accurate visual representation of the pass band. The frequency indicated for each filter is the -3dB point. Use the four softkeys to shift the frequency for each filter. *To quickly shift both filters "off" while in this menu, press the FLAT key to the right of the display.*



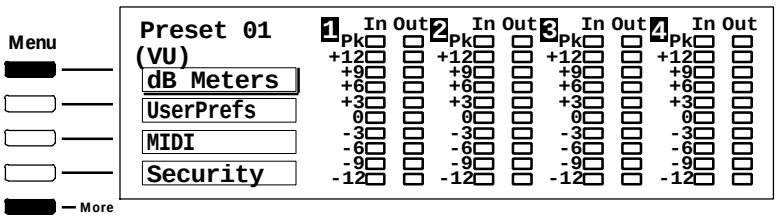
5.3.4 DELAY

The DELAY feature is used to time align two or more loudspeaker sources so that the acoustic energy created by different speakers at different locations arrives simultaneously at a given listening point. Adjustments are made using Course, Medium, and Fine softkeys displaying milliseconds, feet, and meters. **Maximum delay per channel is 1365ms.** *Quickly reset Delay Time to zero by simultaneously pressing the up and down "Course" keys.*

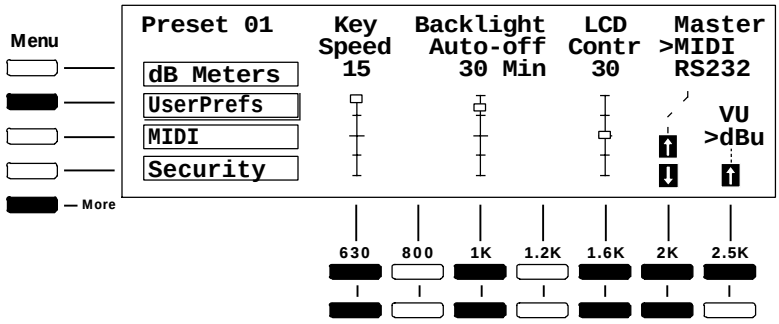


5.3.5 METERING

Press the MORE key to access the second menu screen. Meters display input and output levels in dBu *or* VU, selectable in the UserPrefs menu. ***0 dBu = 0.775Vrms, and +4 dBu = 0 VU. To maintain the highest signal to noise ratio possible, each local channel's input level should nominally be 0 dBu, or -4 VU, allowing 20dB headroom before clipping.*** Each of the four local channels also use a two-color (green/red) LED to indicate signal present (-15 dBu) and clipping (+20dBu) for that channel.



5.3.6 USER PREFERENCES



In this menu, the user is able to adjust KEY SPEED, BACKLIGHT AUTO-OFF, LCD CONTRAST, Master/MIDI/RS232 mode, and selection of dBu or VU meters.

KeySpeed: KeySpeed determines the response time of individual keys, with a higher number meaning faster response.

Backlighting: The Protea LCD display has an Auto-Off option which is used to prolong the life of the fluorescent tube within the display. When the display's backlighting turns off due to the auto-off feature, simply press any key to turn it back on. ***Note:*** *Even though the backlighting tube is off, the display remains active and can be read in sufficient lighting.*

LCD contrast: LCD contrast affects viewing ability under various lighting conditions and viewing angles. Display contrast may drift over time with extended, continuous use, due to temperature changes within the unit.

***** Master:** In a Multi-unit Protea system, *only one unit may act as the Master Controller.* This can be a 4.24RD remote, a 4.24G set to Master mode, or Protea System Software on a PC. ***A single 4.24G used by itself must be set to MIDI.***

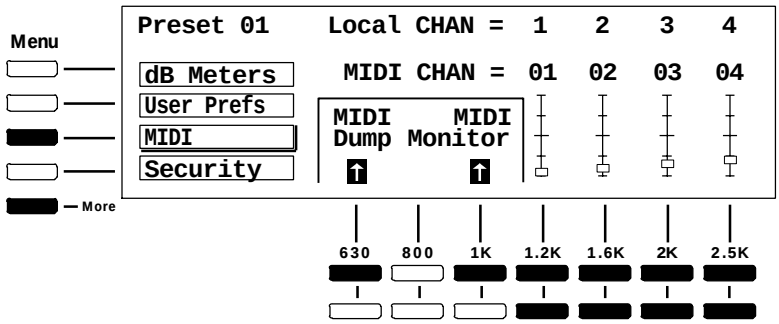
***** MIDI:** MIDI is the data communication protocol between all Master and Slave Protea units. Once the Master unit has been selected, each subsequent unit must be selected to MIDI mode via menu or switches.

***** RS-232: I**n systems where there is PC control using PROTEA SYSTEM SOFTWARE, RS-232 serial communication is used to connect the PC to the first Protea unit in that system.

***** Master, MIDI, and RS232 switch/menu settings for specific products in various applications can be found in the System Configuration table on page 20.**

VU/dBu: Metering mode is selectable to VU (0 VU = +4 dBu), or dBu, where 0 dBu = 0.775Vrms. In addition to the Input/Output Meters, the Compressor-Limiter Threshold and Output level reflect the current VU/dBu status.

5.3.7 MIDI



We have selected the MIDI 1.0 communications protocol for REMOTE CONTROL, or for using multiple Protea devices in a system. The user does not need to fully understand the details of MIDI unless interfacing with a third-party MIDI controller. *For technical details on using external MIDI devices with Ashly Protea products, see the Continuous Controller Reference Table on page 16.*

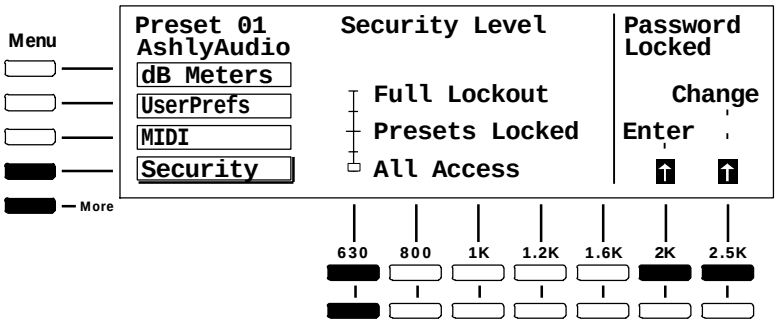
If the system has multiple units or an external MIDI source, this menu allows MIDI CHANNEL ASSIGNMENT to a local channel, simply by scrolling each local channel to midi channel 1-16.

MIDI DUMP is used to copy all 128 presets to another unit, specifically the next one in the MIDI chain. MIDI DUMP takes about three seconds, and will **permanently change all of the presets of the next Protea unit.**

MIDI MONITOR displays the most recent MIDI message received, and is useful for system diagnostics.

5.3.8 SECURITY

Protea products have three levels of password-protected security to prevent unwanted tampering or accidental mistakes. Before making any security level changes, the screen prompts for the current password. ***The factory default password is 1234.***



The password can be up to 10 alphanumeric characters, and is updated by pressing the CHANGE softkey, entering the current password followed by the ENTER softkey, then entering the new password followed again by the ENTER softkey. Note that *the password is CASE SENSITIVE*, meaning that upper-case letters are viewed as being different from lower case letters. *The Security screen always initializes with lower case letters.* Use the CAPSLOCK key to toggle between upper and lower case.

Note: In the event of a forgotten password, turn the AC power on while holding down both RECALL + ESC keys to display the current password.

ALL ACCESS, as the name implies, allows the user to edit or save any parameter in real time.

Selecting PRESETS LOCKED allows editing, but prevents the user from saving any changes to a preset.

For absolute protection, FULL LOCKOUT prevents the user from changing anything, including user preferences and MIDI setup. The user may view, but not change, the current settings of all local channels, user preferences, and MIDI. Once the proper security level has been selected, press the ENTER softkey, or Esc to initiate.

Note: A Remote control or PC will override any security level, as will the master unit in a multi-unit system.

5.4 ON-LINE HELP

Basic on-line help is available for fundamental Protea functions. Pressing the HELP key brings up a list of topics which can be scrolled through with the up/down arrows. When the correct topic is showing, press HELP a second time to display a comment on the desired topic.

5.5 ESC

This is the ESCAPE key. It's job is to instantly exit the current menu location and return the user to the EQ screen of the current channel. Note that pressing Esc while a dialog box is open (Save, Recall, Copy, Flat, Password Enter or Change) only cancels the dialog box. Pressing Esc a second time will return to the EQ screen.

5.6 RECALL

Recalling a PRESET gives the current channel specific settings regarding all audio functions. Protea systems store 128 different user-defined PRESET NUMBERS or PRESET NAMES, both referring to the same settings which can be recalled to the current channel. Every preset has a number (1-128), but a name is optionally entered by the user.

507 SAVE To permanently store the settings of the current c
typing in numbers on the keyboard. Pressing SAVE a second time pr
settings, preset name, and preset number to memory. **508 FLAT** In t
screen, the FLAT key resets the two filter frequencies to "off". **509**
that you want to copy to, then press COPY again to execute the cop
made. Unless it is saved however, no permanent changes are made
will also mute the dependent channels. Local mute overrides a syst
B-D) **Slave Mute:** Slave channels can be muted through external c

5.12 SCENE

The SCENE function is a convenient way to save and recall the block of presets used to create the entire system environment. Up to 50 different scenes may be stored, with each scene capable of controlling up to sixteen local channels. ***Note:*** *Saving a Scene does not store the parameter details within each preset, just the currently loaded preset numbers. When doing a Scene Save with multiple slaves, each slave saves its current loaded preset numbers, but all slaves save the new scene name.* ***Protea System Software has a Scene Save feature which stores the currently loaded preset numbers, as well as the information stored within each preset.***

To save a scene, press SAVE, then SCENE, then the scene number (1-50). Once the desired scene number is either scrolled to or numerically entered, press Save again, which prompts for a scene name. Scene names are optional, but recommended, and can use any text character on the keyboard, upper or lower case, up to ten characters. When a scene name is complete, press SAVE again to write to memory. Recall a scene in the same manner, by pressing RECALL, then Scene, then the correct scene number. ***Note****: When using the remote control unit or PC control with several slave units, the scene name is retrieved from the very first slave connected, but upon saving, all slaves get the name written.*

5.13 CAPSLOCK

This key toggles between uppercase and lower case letters for preset names, scene names and the security password. ***Note:*** *The Security menu always opens with CapsLock set to lower case, meaning that* ***passwords are best entered as lower case characters.***

5.14 GAIN

The GAIN keys only affect audio levels while in the EQ menu, with a range of +6dB to -∞. The Gain keys are also used as up/down arrows to scroll through numbers for preset selection.

5.15 FACTORY RESET

To clear all preset names and reset all controls to their flat, original factory settings, FACTORY RESET may be performed by *simultaneously pressing and holding Esc and Flat* while switching power on. ***Caution: doing this will erase all current presets!***

To do a factory reset on a slave unit, set back panel Switch "A" OUT and Switch "B" IN, then power up unit. A 10 second countdown occurs on the LED character displays indicating a factory reset is about to occur. The countdown may be interrupted at any time by turning off the power or changing either switch on the back panel. If the countdown goes to completion, factory reset has occurred and "f r" is displayed. As long as "f r" is showing, the Protea Slave unit will not function until the Switch A and B are properly set for normal operation as shown in the System Configuration Chart on page 20.

6. INTERCONNECT FEATURES

6.1 AUDIO

All Protea audio connections use XLR and 1/4" TRS (tip-ring-sleeve) phone jacks, with XLR pin 2 and the 1/4" TIP connector as (+). Inputs are precision balanced, and outputs can be used balanced or unbalanced. If an unbalanced signal is fed to the input, the signal should be on the (+) connection and the (-) connection must be tied to ground, or significant signal loss will result. It is strongly recommended that balanced signals be used whenever possible. While a mono phone plug used as an unbalanced connection will automatically ground the (-) ring of the jack, XLR plugs will not automatically do this so attention must be given to proper wiring.

A Note About Input Signal Levels:

There are no analog gain trim adjustments on the Protea processors, therefore all the processing (including gain) is done in the digital domain. The Protea processors were designed this way so that when digital inputs/outputs become available, there will not be any gain stages left out of the all digital signal path. As a consequence of this design philosophy, it is important to feed the Protea processor with the proper nominal signal level to achieve good signal to noise performance as well as headroom before clipping. The Protea processors were designed to clip at signal levels above +20dBu = 7.75Vrms which places the noise floor lower than -90dBu with the current 24-bit A/D and D/A converters. The optimum input signal level which should be fed into the Protea processor is 0dBu = .775Vrms. This input level will allow 20dB of headroom while giving a nominal signal that is 90dB above the noise floor.

6.2 MIDI

MIDI Pin-Out

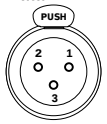
Pin #	Function
1	NC
2	Out & Thru - Ground, In - NC
3	NC
4	Data +5V
5	Data Signal

Interconnection of several Protea units uses MIDI in a closed loop configuration, where one unit is the Master and all remaining units are Slaves. MIDI channel assignment for model 4.24G is done in the UserPref menu, while Slave units have front panel recessed tactile switches adjacent to each LED readout for MIDI channel assignment. Using a pencil point or other narrow object, press the MIDI Channel button until the appropriate channel is selected. Note that Channel "0" disables MIDI control of that channel.

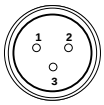
Note: XLR data cables should be used throughout an expanded system when the 4.24RD remote controller or any slave unit is used. MIDI cables are used only when multiple 4.24G units are chained together or when connected to a third-party MIDI controller.

Protea 4.24G Main or Any Slave Data Connector Pin-Out

Data In XLR



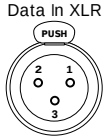
Data Out XLR



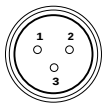
Pin #	Function	(Midi Pin #)	Pin #	Function	(Midi Pin #)
1	Phantom Ground	N / A	1	+24V Phantom Out	N / A
2	Data +5V	4	2	Data +5V	4
3	Data Signal	5	3	Data Signal	5

4.24RD Remote Control Data Pin-Out

Data In XLR



Data Out XLR



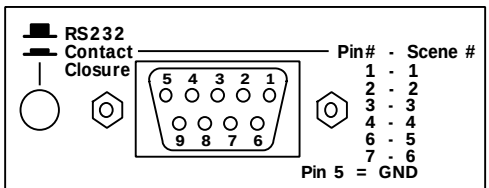
Pin #	Function	Pin #	Function
1	+24V Phantom In	1	Phantom Ground
2	Data +5V	2	Data +5V
3	Data Signal From Host	3	Data Signal to Host

NOTE: It is crucial not to use any isolation transformers in the data connections. Also, when using XLR microphone cables for data connections, pin 1 cannot be tied to ground anywhere along the transmission line, or the unit may fail to function.

6.3 RS-232 DATA

Protea System Software for Windows communicates to the Protea hardware via RS-232, using the computer's serial port (usually COM 1-4). The software can control 16 mono or 16 stereo channels. COM port assignment is done in the software under the COMMUNICATIONS menu, and the Protea's connector is a D-Sub 9 pin female, fully compatible with a PC serial COM port. **Note that the RS232 connector can be switched instead to a six-scene recall Contact Closure port on any of the Protea slave units.**

Model 4.24G has a Data Configuration switch on the back panel, while every slave unit has a Data Configuration switch *"B"*, as well as a Baud Rate Select Switch *"A"* on the back panel. For various switch settings, cable types, baud rate selections, and software setups used in Protea applications, see the SYSTEM CONFIGURATION chart on page 20.



RS232 / Contact Closure Connector (Contact Closure on Slaves Only)

6.4 CONTACT CLOSURES and Remote Scene Recall (Slaves Only)

Protea slaves store individual presets and scenes the same way as the main 4.24G. Since there is no way to access or alter these presets once the controlling hardware or software is removed, the need arises to use a small number of pre-defined settings, or scenes, for different situations within the scope of the installation ie., room full, room empty, volume at half, room divided, etc. Contact Closures offer an easy way to recall each of the first six Protea slave scenes (see sec. 5.12 SCENE) with an external remote switch. ***PC control cannot co-exist with contact closures.***

Remove the RS232 cable if used, then press the D-Sub connector's recessed switch to enable Contact Closure mode. Scene change occurs upon closing, or connecting, a "hot pin" (see above chart) to the provided GND pin #5, presuming no other hot pins are closed. The front panel LED will display "C X" where X is the scene number selected. The six pins can be individually wired to momentary switches or to a rotary switch, allowing pre-programmed changes to a Protea slave unit. Custom wiring may be used, or a six-position Contact Closure rotary switch assembly is available from your Ashly dealer.

7. MIDI IMPLEMENTATION

******NOTE! Read this section before using several Protea units controlled from a Master or Remote.***

7.1 MIDI AND THE 4 BANKS

There are 16 MIDI channels, and any local channel in a Protea system may be independently set to any one of the 16 MIDI channels. This is how 16 different audio channels are controlled from one remote or master.

On the remote/master:

Bank A is MIDI Channels 1 - 4

Bank B is MIDI Channels 5 - 8

Bank C is MIDI Channels 9 - 12

Bank D is MIDI Channels 13 - 16

MIDI messages in a Protea system are transferred in a closed-loop system, and all commands are verified. Only one command can be executed at a time throughout the entire system. ***Note:*** *When a Protea 4.24G is selected as the Master (via UserPrefs menu), it's 4 channels are ALWAYS automatically set to MIDI Channels 1 - 4.* ***Also Note:*** *The pop-up message "Unit Not Responding" is displayed whenever the user selects a Bank or Channel key for which there is no physical channel with that MIDI channel assigned.*

When a parameter is changed from the remote, a system message is transmitted to the selected MIDI channel, stating which parameter to change, along with it's new value. ALL Protea system channels set to that MIDI channel will respond accordingly. ***Note:*** *Simultaneous adjustments made on a 4.24G main unit and 4.24RD remote control will be treated as "first come, first served" in that the earliest entered command from either unit has priority.*

7.2 SELECTING THE MIDI CHANNELS

From within the second screen (MORE) of the menu keys, press the MIDI option. This will bring you into the main MIDI screen. At the top of the display you will see "Local Chan = 1 2 3 4", representing the audio channels within that physical Protea unit. Underneath that line, you will see "MIDI Chan = " and then four numbers. This represents the MIDI Channel assigned to the local channel displayed directly above it. To change the MIDI Channel, use the keys directly below each fader graphic for that channel.

Note*: The top step on the MIDI Channel Fader is "OFF". When a Protea Channel is set to OFF, it will not be affected by any Midi messages on any channel.*

We suggest that unless you require unusual mapping of the MIDI Channels in your system, that you match the MIDI Channels in the units as shown below.

Protea 4.24G #1 = Audio channels 1 - 4 (Bank A)
MIDI Channels 1 - 4 (Master - automatically assigns MIDI Channels 1-4 when selected as Master)

Protea #2 = Audio channels 5 - 8 (Bank B)
MIDI Channels 5 - 8 (1st slave)

Protea #3 = Audio channels 9 - 12 (Bank C)
MIDI Channels 9 - 12 (2nd slave)

Protea #4 = Audio channels 13 - 16 (Bank D)
MIDI Channels 13 - 16 (3rd slave)

7.3 CONTINUOUS CONTROLLER REFERENCE TABLE

4.24G Main and Graphic Slaves

No.	Protea Control Name	Protea Control Range	MIDI Value Range
0	31Hz	-15dB to +15dB	4 to 124
1	40Hz	-15dB to +15dB	4 to 124
2	50Hz	-15dB to +15dB	4 to 124
3	63Hz	-15dB to +15dB	4 to 124
4	80Hz	-15dB to +15dB	4 to 124
5	100Hz	-15dB to +15dB	4 to 124
6	125Hz	-15dB to +15dB	4 to 124
7	160Hz	-15dB to +15dB	4 to 124
8	200Hz	-15dB to +15dB	4 to 124
9	250Hz	-15dB to +15dB	4 to 124
10	315Hz	-15dB to +15dB	4 to 124
11	400Hz	-15dB to +15dB	4 to 124
12	500Hz	-15dB to +15dB	4 to 124
13	630Hz	-15dB to +15dB	4 to 124
14	800Hz	-15dB to +15dB	4 to 124
15	1KHz	-15dB to +15dB	4 to 124
16	1.2KHz	-15dB to +15dB	4 to 124
17	1.6KHz	-15dB to +15dB	4 to 124
18	2KHz	-15dB to +15dB	4 to 124
19	2.5KHz	-15dB to +15dB	4 to 124
20	3.1KHz	-15dB to +15dB	4 to 124
21	4KHz	-15dB to +15dB	4 to 124
22	5KHz	-15dB to +15dB	4 to 124
23	6.3KHz	-15dB to +15dB	4 to 124
24	8KHz	-15dB to +15dB	4 to 124
25	10KHz	-15dB to +15dB	4 to 124
26	12KHz	-15dB to +15dB	4 to 124
27	16KHz	-15dB to +15dB	4 to 124
28	Master Gain	OFF to +6dB	4 to 124
29	Limiter Threshold	-20dBu to +20dBu	44 to 84
30	Limiter Ratio	1:1 to ∞:1	60 to 68
31	Limiter Attack	.5ms to 50ms	61 to 67
32	Limiter Release	10ms to 1 sec	61 to 67
33	Highpass Freq.	20Hz to 10.6KHz	4 to 113
34	Lowpass Freq.	33Hz to 20.1KHz	13 to 125
35	Delay (Coarse Adjust)	0 to 677ms	0 to 127
36	EQ In/Out	Out, In	0 to 63, 64 to 127
37	Limiter In/Out	Out, In	0 to 63, 64 to 127
38	HPF In/Out	Out, In	0 to 63, 64 to 127
39	Delay In/Out	Out, In	0 to 63, 64 to 127
40	Channel Mute	Out, In	0 to 63, 64 to 127
41	Limiter Pre/Post EQ	Pre, Post	0 to 63, 64 to 127

Parametric Slaves

No.	Protea Control Name	Protea Control Range	MIDI Value Range
50	Filter 1 Fc	19.7Hz to 20.1KHz	0 to 120
51	Filter 1 BW	1/40 Oct. to 3 1/3 Oct.	0 to 66 (stepsize = 2)
52	Filter 1 Level	-20dB to +10dB	0 to 120 (stepsize = 2)
.	.	.	.
53-82	Filters 2-11	Same	Same
.	.	.	.
83	Filter 12 Fc	19.7Hz to 20.1KHz	0 to 120
84	Filter 12 BW	1/40 Oct. to 3 1/3 Oct.	0 to 66 (stepsize = 2)
85	Filter 12 Level	-20dB to +10dB	0 to 120 (stepsize = 2)
86	Low Shelf Freq	19.7Hz to 243Hz	0 to 87
87	Low Shelf Level	-15dB to +15dB	0 to 60
88	High Shelf Freq	1.63KHz to 20.1KHz	0-87
89	High Shelf Level	-15dB to +15dB	0 to 60
90	Master Gain	Off to +6dB	4 to 124
91-94	Limiter Threshold, Ratio, Attack, Release (Same as Graphic Limiter)		
95-96	Highpass Freq, Lowpass Freq (Same as Graphic)		
97	Delay - Coarse Adjust (Same as Graphic)		
98	EQ In/Out	Out, In	0 to 63, 64 to 127
99	Limiter In/Out	Out, In	0 to 63, 64 to 127
100	HPF/LPF In/Out	Out, In	0 to 63, 64 to 127
101	Delay In/Out	Out, In	0 to 63, 64 to 127
102	Limiter Pre/Post	Pre, Post	0 to 63, 64 to 127
103	Param. Filter 1 In/Out	Out, In	0 to 63, 64 to 127
.	.	.	.
104 - 114	Par. Filter 2-12 In/Out	Out, In	0 to 63, 64 to 127
.	.	.	.
115	Low Shelf In/Out	Out, In	0 to 63, 64 to 127
116	High Shelf In/Out	Out, In	0 to 63, 64 to 127
117	Channel Mute	Unmute, Mute	0 to 63, 64 to 127
118	Low Shelf Slope	6dB / 12dB per Oct.	0 to 63, 64 to 127
119	High Shelf Slope	6dB / 12dB per Oct.	0 to 63, 64 to 127

***Note: Due to limitations of MIDI, continuous controllers may not necessarily offer the complete range or resolution of features found within the main 4.24G or 4.24RD Remote Control. Identical functions on Graphic and Parametric slaves are given unique controller numbers so independent operation of either unit is possible while both are in the same Protea system.**

8. PROTEA REMOTE CONTROL

The remote control unit (model 4.24RD) is essentially the "front end" of the 4.24G system processor. It has a similar interface, but without any audio capabilities. It is used to control the 4.24G, 4.24GS, and 2.24GS, or various combinations of the three, from a remote location up to 1000 ft away. Two standard XLR cables are used to connect the remote control to an audio unit. ***Note:*** *The XLR cables provide DC phantom power to the remote, so* ***pin 1 should never be connected to ground, and isolation transformers must not be used****.* For complete information on configuration options when using the remote control, see the table on page 20. ***Note that the 4.24RD remote will not control either Parametric Slave. Parametric slaves will only respond to commands from Protea System Software, and while both types of slaves can be used together, it is best to only use PC control for such hybrid systems.***

To conform with the communication standard used in a Protea System, the following functions found in the main unit are disabled on the remote control.

1.) Channel Linking
2.) Signal Present and Clipping LEDs
3.) Master/Slave select - The remote control always acts as the Master
4.) RS-232/MIDI select - The remote control always sends MIDI data
5.) MIDI Channel assignment is not applicable, as there are no audio channels on the remote
6.) MIDI Monitor is not applicable
7.) Security Screen is disabled - It is assumed that anyone who can access the remote control is fully authorized to use it.

9. PROTEA SLAVE UNITS

Four slave units are offered in addition to the 4.24G system processor. Two are Graphic EQ slaves (GS), and two are Parametric EQ slaves (PS). Graphic slaves are controlled by a 4.24G main unit, 4.24RD remote control, or Protea System Software, while *Parametric slaves are controlled only with Protea System Software.* One or more slaves can be installed in a permanent installation where the EQ, Compressor/Limiter, HPF/LPF, and Time Delay are all pre-adjusted, then the controller or PC is removed, while settings are permanently stored in the slave's memory. Contact Closures (see sec. 6.4) allow scene recall without risk to preset values. Multiple slaves can be chained together for up to 16 mono or stereo channels. The MIDI channel assigned to each physical channel (see sec. 7.2) is displayed on the front panel, and is selected using the recessed momentary tactile switch beneath each LED display. Note that channels set to 0 (off) will continue to function as-is, but will not respond to any MIDI or RS232 control messages.

Two switches on the back panel must be properly set according to the specific application of the slave unit. The switch labeled "A" is for Baud Rate Select, and "B" is a Data Configuration switch (see the table on page 20).

Note: *In addition to showing MIDI Channel assignments, the front panel numerical LEDs indicate the current firmware version (on power-up), low battery (Lb), factory reset (Fr - see sec. 5.15), and channel mute (flashing).*

10. PROTEA SYSTEM SOFTWARE

Ashly has created a powerful Protea software interface for the Windows95™ or Windows98™ environment, providing all the functionality of the Protea Remote Control, while utilizing the additional power and portability of a PC. ***Parametric slaves require Protea System Software to initially set up the presets and scenes.*** The software is flexible enough to set up as little as a two-channel slave unit, or as much as a full 16 channel stereo graphic, stereo parametric, or a combination of both. *Ashly's VCM-88, a high performance eight channel remote level controller, is also addressed by Protea System Software using any Protea's DATA THROUGH jack into the MIDI IN of the VCM-88, allowing control of up to 128 different audio signals.*

10.1 HOW TO GET PROTEA SYSTEM SOFTWARE

Three 3 1/2" disks containing Protea System Software are shipped free with each Protea Slave unit, or disks can be purchased directly from Ashly for a nominal fee. To download the same for free or to check for the latest software upgrades on the Ashly Web site, go to <www.ashly.com> and follow the link to the Protea section, then click on the line <Download Protea System Software>, noting which folder on your computer the file is saved in.

10.2 INSTALLING PROTEA SYSTEM SOFTWARE

The installation program is the same whether from the web site or from a disk, and is called <Pssinstl.exe>. There is currently no version available for Mac™, DOS™, or Windows 3.1™. To install Protea System Software, double-click on <Pssinstl.exe> and follow the installation instructions.

10.3 CONNECTING TO A COMPUTER

****** Before attempting computer control, EXACT settings must be made to hardware switches and User Preferences on ALL Protea units involved. See the Protea System Configuration Table on page 20 for details.***

Protea System Software uses RS-232 serial data communications through the computer's serial port using a 9-pin D-sub connector. RS-232 will run reliably to about 50 feet.

The user must select a serial port to use from the COMMUNICATIONS menu within Protea software (ex. com1, com2, com3, or com4) depending on the availability of ports on the computer.

DOS, WINDOWS 3.1, Windows95, and Windows98 are a trademarks of Microsoft Corporation. Mac is a trademark of Apple Computer, Inc.

11. TROUBLESHOOTING - *See Also "Protea Quick Reference Guide"*

11.1 - 4.24G Main & 4.24RD Remote Control Troubleshooting Tips

Controls don't work - check the Security Level. If set to Full Lockout, then Protea unit is "view only"
No sound - Check to see if Channel Mute is on
Excessive Noise - Be sure audio source nominal Input level is 0dBu, using Metering Menu
Audio controls have no effect - Properly set IN/OUT for each audio function
Forgot the password - Read section **5.3.8** (Security)
Password is not accepted - Password is case sensitive - screen initializes with lower case letters. Use CapsLock to toggle upper/lower case.
Display is unreadable - Change LCD Contrast in UserPrefs menu (see section **5.3.6**)
Backlight is turned off - Change Backlight Auto-off time in User Prefs menu
Key response too slow - Change Key Speed in UserPrefs menu
Slave Not Responding message - If unit is set as master, slave units are not properly connected or configured. If unit is stand-alone or slave, set to Slave status in UserPrefs menu
Unable to use Banks - Set to Master status in UserPrefs menu
Unable to select unit as Master - Set RS232/MIDI to MIDI in UserPrefs menu
No response to PC control - Set RS232/MIDI to RS232 in UserPrefs menu. Set Data Config switch out
Screen display becomes irregular - Try running Factory Reset (see section **5.15**).

11.2 - Slave Troubleshooting Tips

No Sound - check Mute status on individual channels (MIDI Channel display flashes when muted)
check Gain in master's EQ screen, is unit in "factory reset" mode? ("f r" displayed - see sec 5.15)
No Control - check that the MIDI Channel Display matches the MIDI channel assignments of the controlling unit. Also check that switch "A" and "B" are configured properly, and that proper wiring is used (see page 20).

11.3 - Battery Replacement

**** * * Caution * * ****

Caution: Refer battery replacement to a qualified service technician. The Protea processors contain an internal coin cell battery used to store presets and user preference settings. This battery will typically last 5 years or longer. The battery is automatically checked whenever the power is switched on and once every hour. If the battery is low, the pop-up message “Replace Battery” will appear. Pressing any key will remove the message. ***Note:*** *The slave units will alternately flash "L b" with the currently assigned MIDI channel when a low battery condition occurs*. Once the message appears, the battery will last several more days before presets are lost. The battery should be replaced with a Panasonic BR2325, CR2330, or equivalent 3 volt coin cell that is .91" in diameter and between .1" and .12" in height. ***The battery should be replaced with power off and the AC cord removed.*** With power off, the Protea processor will retain its presets for approximately one minute with the old battery removed. The battery (+) side should face up.

**** * * * Please read each section of this manual carefully to make sure small details have not been overlooked* * * ****

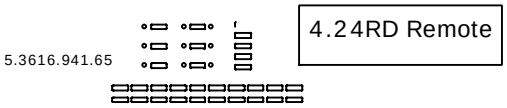
The SYSTEM CONFIGURATION table on page 20 is a good starting point for troubleshooting. Also, make sure good quality cables are used with connectors soldered on the correct pins. ***Keep the "Quick Reference Guide" handy at job sites.*** *If all else fails, get in touch with your Ashly dealer, or contact the Ashly service department.*

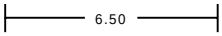
12. WARRANTY INFORMATION

The unit you have just purchased is protected by a limited five-year warranty, with the exception of the LCD Display which is covered by a two year warranty. To establish the warranty, be sure to read completely, fill out and return the warranty card that came with your product. Fill out the information below for your records.

Model Number _____ Serial Number _____ Dealer _____
Date of Purchase _____ Dealer’s Address _____
Dealer’s Phone _____ Salesperson _____

13. DIMENSIONS





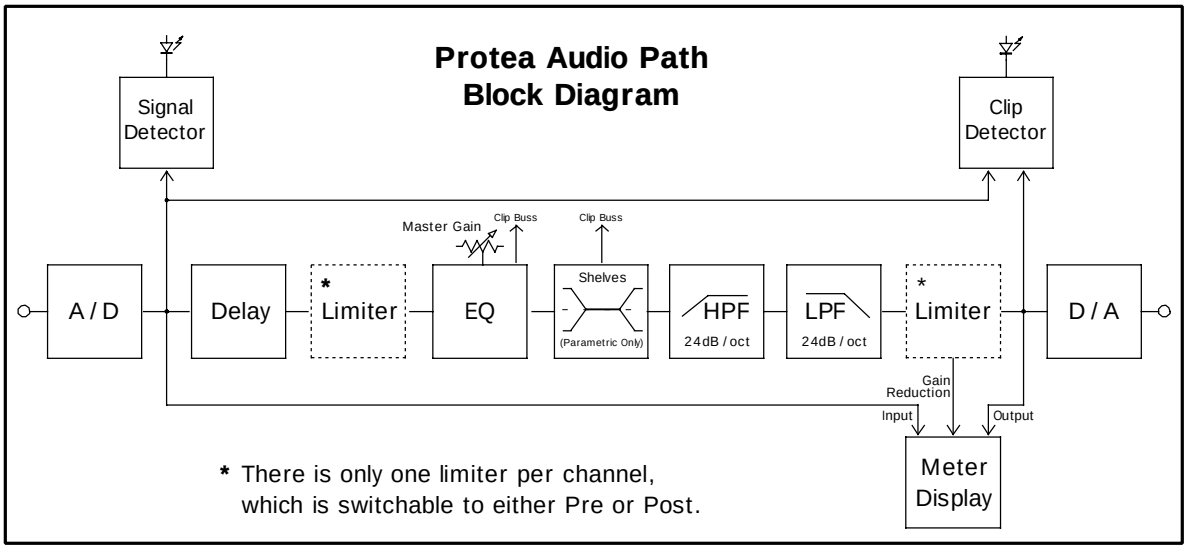
14. SPECIFICATIONS

Input	Active Balanced, 18KΩ
Max. Input Level	+20dBu
Output	Pseudo-Balanced, 100Ω
Max. Output Level	+20dBu
Frequency Response	20Hz to 20KHz, ±0.25dB
THD	<0.01% @ 1KHz, +20dBu
Dynamic Range	>110dB 20Hz - 20KHz unweighted
Signal Present & Clip	-15dBu, +20dBu
Audio Sampling Rate	48KHz
Propagation Delay	1.46mS
Remote Distance	>1000 ft
AC Requirements	90-125VAC, 50/60Hz, 180VAC - 250VAC 50/60Hz switchable
Environmental	40°F - 120°F (4°C-49°C) Non-condensing

Model	**Weight**	**Power**
4.24G	14 Lbs	30W
4.24RD	5 Lbs	NA
4.24GS/PS	13 Lbs	27W
2.24GS/PS	9 Lbs	20W

Protēa Digital Audio Products		4.24G Settings		Slave Switch Settings On Back Panel	
System Configuration	**Data Connectors**	**Data Config Switch** On Back	**Master/MIDI/ RS232** UserPref	**Switch "A"** (Baud Rate)	**Switch "B"** (Data Config)
4.24G Only		Out	MIDI		
Multiple 4.24G	(XLR or MIDI)	Out	Master on 1st		
4.24G + Remote	XLR	Out	MIDI		
4.24G + Slaves	XLR	Out	Master	Out	Out
Slaves + Remote	XLR			Out	Out
4.24G + Slaves + Remote	XLR	Out	MIDI	Out	Out
PC + 4.24G	RS-232	Out	RS-232		
PC + 4.24G + Slaves	RS-232 XLR	In	RS-232	 In	 Out
PC + 1 Slave	RS-232			In	Out
PC + Multiple Slaves	RS-232 to 1st XLR to others			In In	In on 1st Slave Out on others

PROTEA SYSTEM CONFIGURATION TABLE



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